



## Substitute Specification

2

### 3           **REMOTE CONTROL METHOD FOR CONTROLLING** 4           **ELECTRICAL APPLIANCE VIA HOME GATEWAY**

#### 5           **BACKGROUND OF THE INVENTION**

##### 6           1. Field of the Invention

7           The present invention relates to a remote control method, and more particularly to a  
8           remote control method for controlling electrical appliance via a home gateway. The  
9           method proceeds with an input signal by a telephone call to initialize the connection of  
10           main board (the host) to the INTERNET. After registering with a specific DNS server to  
11           have a pre-registered IP address, a user is able to control the operation of household  
12           electrical appliances.

##### 13           2. Description of Related Art

14           Automation is currently a synonym for modernization. People try every possible  
15           means to make our life easy, simple and more convenient. One approach is to remotely  
16           control household electrical appliances. In the early phase, people tried to control  
17           appliances by inputting a code through a phone call. By pressing the telephone buttons,  
18           digital signals are generated to control the operation of the appliance. However, to  
19           control the appliance, the user has to memorize a complicated combination of numbers  
20           or a series of numbers so as to proceed with the control, which is quite complex for the  
21           user and not convenient. Recently, another approach has been to proceed with the  
22           control by means of the INTERNET, using two different types of control. The first one  
23           is similar to the previously mentioned conventional method, which is accomplished by a  
24           56K modem accessing the main board. The second method is accomplished by ADSL  
25           broadband, which provides a channel to communicate with the main board. The first

1 method has limitations such as the low speed of data transmission and the need to  
2 provide a telephone line during the entire communication. The second method mitigates  
3 the speed problem. However, the fixed IP connection tends to generate high control  
4 costs during the process and may not be popular for home use.

5 To overcome such shortcomings, the present invention intends to provide an  
6 improved control method to mitigate or obviate the aforementioned problems.

7 **SUMMARY OF THE INVENTION**

8 The primary object of the invention is to provide a method to control a household  
9 electrical appliance through a gateway provided in each individual house. The  
10 connection with the INTERNET is initialized only when a phone call is made to activate  
11 the home gateway so that the connection cost is kept as low as possible.

12 Another object of the invention is to provide a home gateway that is able to function  
13 as a fax server so as to send/receive faxed data.

14 Still, another object of the invention is to provide an improved controlling method  
15 to activate the household electrical appliance through the indoor electrical wiring so that  
16 there is no need for extra installation of transmission media to carry the code to various  
17 appliances.

18 Other objects, advantages and novel features of the invention will become more  
19 apparent from the following detailed description when considered in conjunction with  
20 the accompanying drawings.

21 **BRIEF DESCRIPTION OF THE DRAWINGS**

22 Fig. 1 is a system diagram showing the connection between the home gateway and  
23 electrical appliances;

24 Fig. 2 is a diagram showing the internal structure of the home gateway;

25 Fig. 3 is a schematic view showing the control of the home gateway to various

1 electrical appliances;

2 Fig. 4 is a schematic view showing the control of the home gateway to various

3 electrical appliances through the electrical wiring;

4 Fig. 5 is a schematic view showing the signal transmission interface with the

5 electrical appliances;

6 Fig. 6 is a schematic view showing the process of code transmission to control the

7 electrical appliances; and

8 Figs. 7 and 8 show application of the control method through GSM and WAP

9 cellular phones.

10 **DETAILED DESCRIPTION OF PREFERRED EMBODIMENT**

11 With reference to Fig. 1, the remote control method for controlling electrical  
12 appliances via home gateway has a main board (10). The main board (10) provides  
13 multiple personal computers (the number of PCs may be up to 253) (30) to access to the  
14 INTERNET by means of ADSL. Furthermore, the main board (10) is able to transmit  
15 the controlling code (data) to appliances through the electrical wiring (20) so as to  
16 activate the appliances. The main board (10) is able to connect to a modem (50)  
17 connected to a phone line so as to connect to a printer, such that the user is able to  
18 transmit or receive data through the modem (50).

19 With reference to Fig. 2, the main board (10) has a controller (11) and two  
20 INTERNET ports, one of which is a WAN port (16) to connect to the INTERNET (18)  
21 by way of a router (17) while the other is a hub (15) to provide access to PCs to connect  
22 to the INTERNET (18). Two RS 232 ports are provided on the left side of the drawing,  
23 one of which is connected to a power line modem (110) to engage with the household  
24 electricity so that the control code is able to be carried away by the electrical wiring,  
25 while the other RS 232 port is a communication port to connect to a modem connecting

1 port (12). Furthermore, another printing port (14) is connected to a printer to provide a  
2 USB connecting port (13) to the USB device.

3 With reference to Figs. 3 to 5, when the method is implemented, at first, the main  
4 board (10) is off-line with respect to the INTERNET (18). When the user makes a call to  
5 the modem (50) and accesses the main board (10) through inputting a predetermined  
6 password, the main board (10) will automatically link with the INTERNET (18) after  
7 the password is verified. When linking with the INTERNET (18), the main board (10)  
8 will have to register with a specific DSN server to have a pre-registered IP address so  
9 that the main board (10) has the IP address available for outside connections. Then, the  
10 user is able to use INTERNET access equipment (60), e.g., a PC, PDA, Webpad, SMS  
11 mobile phone, or WAP mobile phone, to retrieve the front page built into the IP address  
12 in the main board (10). The application is shown specifically in Figs. 7 and 8, in which a  
13 GSM mobile phone, a WAP mobile phone, or a GPRS mobile phone is able to have  
14 access to the INTERNET (18) through a GSM, WAP or GPRS server, so that the user  
15 has access to the individual home gateway and thus can control the appliances.

16 With reference to Fig. 6, the operation procedure of the method comprises the step  
17 of data wrapping (66). After the data is wrapped, the data enters a server (62), the main  
18 board (10), proceeds to the user ID verification and password confirmation step (63).  
19 Then the electrical appliance confirmation is processed (64). When the subject is  
20 confirmed, a control code confirmation (65) is processed. After the control code is  
21 confirmed at the previous step, the control code is ready for transmission to the output  
22 interface, an RS 232 port. As shown in Fig. 4, due to the existing electrical wiring in  
23 each individual house, the control code is able to transmit to each of the electrical  
24 appliances through the aid of the modem (50) and by way of the electrical wiring.  
25 Therefore, there is no need to have extra transmission media to transmit the controlling

1 code, which is quite convenient for the user.

2 With reference to Fig. 4, the power line modem (110) in the main board (10) is able  
3 to transform the control code into a modem-compatible language so that a similar power  
4 line modem (71) in the individual appliance (70) is able to communicate with the power  
5 line modem (110) in the main board (10). Thereafter, a microprocessor (72) is  
6 responsible for processing the received signal from the modems (110,71).

7 With the foregoing method, the connection cost to the INTERNET is kept to a  
8 minimum and the user only needs to memorize the password to access the main board  
9 (10), so the method is a user friendly method and quite convenient in use.

10 Even though numerous characteristics and advantages of the present invention have  
11 been set forth in the foregoing description, together with details of the structure and  
12 function of the invention, the disclosure is illustrative only, and changes may be made in  
13 detail, especially in matters of shape, size, and arrangement of parts within the  
14 principles of the invention, to the full extent indicated by the broad general meaning of  
15 the terms in which the appended claims are expressed.

16